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FEDERAL-GRANT RESEARCH
at the
STATE AGRICULTURAL
EXPERIMENT STATIONS

Projects on
ANIMAL HUSBANDRY
Part 4, Section c
Swine

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Compiled May 1958 by

The State Experiment Stations Division, Agricultural Research Service, U.S. Department of Agriculture, Washington 25, D. C., for use of workers in agricultural research in the subject-matter areas presented. For information on specific research projects write to the Director of the Station where the research is being conducted.

Issued July 1958

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INTRODUCTION

This compilation is one of a series providing information on State agricultural experiment station research supported by Federal-grant funds appropriated annually by Congress under authorization of the Hatch Act of 1887, as amended and approved Aug. 11, 1955, and Section 204 (b) of the Agricultural Marketing Act of 1946. It is prepared for use by research workers in the subject-matter areas presented. Only that part of each State's research program supported by Federal-grant moneys is included.

In addition to the Federal-grant moneys, the State experiment stations receive some Federal support through cooperative agreements or contracts with the U. S. Department of Agriculture. Information on such research, along with other departmental research, is available in the Central Project Office, Agricultural Research Service.

A substantial part of each State agricultural experiment station's research is supported with moneys appropriated by the respective State or Territorial Legislatures and through other forms of private and public financing. Information on current agricultural research at the stations which is not financed under the Federal-grant program or through USDA cooperation can be obtained from experiment station directors.

The information given in the series of Federal-grant compilations includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project if it is a contributing project.

Relevant regional projects, if any, appear at the end of the compilation. States having projects contributing to regional projects are indicated. The Roman numeral (and capital letter) refer to the location in the summary of the contributing project title and objectives. The States are grouped into four major regions. These are designated NC-North Central, NE-Northeastern, S-Southern, and W-Western. The capital letter "M" following the letters for the region indicates regional marketing projects.

SWINE

BREEDING

Ala. Methods of Developing Improved Strains of Swine for the Southeast by Breeding. To study effectiveness of a selection program based on cross-performance in developing improved strains of swine.
Anim. Husb. and Nutr. 529

Ark. Improvement of Swine Through System of Breeding. To (1) develop practical system of swine breeding which should result in greatest possible production of high quality pork; (2) maintain and improve existing UArk line of Poland Chinas so it can continue to be used for basis of breeding program and further dissemination to purebred and commercial breeders, and other inbred lines and breeds not previously tested with UArk lines; and (3) continue to emphasize carcass quality, rate of gain, and efficiency of gain in selection program.
Anim. Indus. and Vet. Sci. 174

Ga. The Relative Productive Value of Various Crossbreeding Systems for Use with Livestock. To learn (1) productive value of crosses and rotational breeding systems; (2) how single and double crosses compare, and comparison with a random-bred population; (3) comparison of 2, 3, and 4 lines or populations used in a rotational program, with single and double crosses, and with a random-bred population; (4) how many different populations should be used in a rotational program to get maximum economic performance; and (5) how performance of a rotation can be predicted from lines performance or single cross performance. Mice used as test animals.
Anim. Husb. 318

Ind. The Identification of Superior Strains of Meat-Type Swine. To (1) identify lines of swine that are outstanding in performance and produce superior meat carcasses; (2) investigate correlations between growth, feed efficiency, and carcass merit of swine, and relate differences in these characteristics with physiological differences between lines; and (3) evaluate various methods of selection for superior meat type.
Anim. Husb. 740

Ind. Evaluation of New Concepts in Quantitative Genetics with Laboratory Organisms. To (1) utilize Triboliumcastaneum as biological check on results obtained with Drosophila melanogaster in comparing various breeding methods; (2) learn effectiveness of various breeding methods for improving performance of plateaued populations; (3) determine with Drosophila and Tribolium the relative effectiveness of a recently proposed modification of Reciprocal Selection; (4) determine genetic mechanism of heterosis or hybrid vigor in Drosophila by genetic fractionation of plateaued populations and single cross hybrids with "Marked Inversion Technique"; and (5) utilize Drosophila and Tribolium for biological evaluation of other new concepts arising in quantitative genetics.
Poultry Sci., Agr. Statis. 920 (NC-47) Coop. ARS

Ind. The Improvement of Swine Through the Application of Breeding Methods. To (1) continue investigating methods of improving fertility, rate and economy of gain, and carcass merit of inbred lines; (2) establish lines of Durocs by different criteria and methods of selection from a single foundation; (3) test value of inbred lines in various crosses for improvement in production and carcass merit; and (4) continue study of physiological characteristics useful in learning performance value of lines.
Anim. Husb., Vet. Sci. 941 Coop. ARS

Iowa Improvement of Swine Through Breeding. To find breeding methods more effective in improving swine productivity, giving major emphasis to problems of simultaneous inbreeding and selection.
Anim. Husb. and Dairy Husb., Vet. Med. 1127 Coop. ARS

Ky. Hampshire Swine Herd Improvement Project. To develop an improved herd of Hampshire swine by testing and selection methods that can be used by almost any breeder.
Anim. Indus. 251

La. Improvement of the Carcass Qualities of a Herd of Duroc Swine by the Development of Inbred Lines. To test the method of improving the carcass qualities of a herd of Duroc swine by development of inbred lines - the better lines to be combined at a suitable time.
Anim. Indus. 812

Mass. Antigenic Factors in the Blood of Swine. To (1) confirm existence of antigenic factors in blood of swine; (2) study their mode of inheritance; and (3) learn correlation of antigenic factors with survival, growth characteristics, and reproductive performance.
Dairy and Anim. Sci. 148

Minn. A Study of Systems of Breeding for the Improvement of Swine. To (1) use two inbred lines already made and the third well along in development as basis for further improvement in the lines and methodology; (2) develop sub-lines of the basic lines and learn how to improve already good genetic material; (3) continue to simplify technique of applying basic genetics to livestock improvement; and (4) gather reliable data so they may be analyzed statistically.
Anim. Husb. 1401 Coop. ARS

Minn. A Study of the Interaction of Genetics and Environment in Swine. To (1) study interaction of different levels of feeding and rate of gain on economy of production and quality of carcass in different Minnesota No. 1, No. 2, and No. 3 crossbred combinations; (2) introduce sub-lines of the above into this study; (3) study different genetic groups in respective responses to varied hormone treatments; and (4) learn more of the interaction of genetics and environment in swine.
Anim. Husb. 1420

Mo. Methods of Selection and Breeding for Swine Improvement. To develop more effective breeding methods for improving the efficiency of production and the value of the end product--the hog--more specifically to (1) continue testing effectiveness of recurrent selection for improving the performance of strain crosses, using outbred and crossbred matings as controls; (2) develop more accurate and useful measures of fertility, prolificacy, sow productivity, rate and economy of gain and carcass desirability for use in selection; (3) investigate the influence of different management and feeding practices on expression of hereditary differences of performance in swine; (4) explore further the fundamental nature of inbreeding and heterosis effects on reproduction, growth, viability, feed utilization, milk production, and carcass composition in swine; (5) expand the useful strains or cross combinations through cooperating breeders and swine producers for the production of market hogs; (6) encourage swine producers to use breeding principles developed in this project in selecting their own breeding stock and making mating plans for commercial and purebred hog production; and (7) develop new inbred lines of hogs within a breed for possible crossing performance using principle of reciprocal recurrent selection.
Anim. Husb. 3 Coop. ARS

Mo. Hemorrhagic Conditions in Farm Animals. To study (1) the physiological and biochemical phenomena associated with hemorrhage in farm animals; and (2) other hemorrhagic conditions affecting Missouri farm animals.
Agr. Chem. 56

Nebr. Systems of Breeding for the Genetic Improvement of Economic Traits of Swine. To (1) learn relative effectiveness of selection in closed populations developed from within a single breed and from crossbred foundations; and (2) evaluate role of recombination in the genetic improvement of quantitative traits.
Anim. Husb. 240 Coop. ARS

Nev. The Effect of Plane of Nutrition on Selection for Traits of Economic Importance in Swine. To learn (1) if mass selection is effective in developing a strain of meat type swine that will gain rapidly and economically on a high roughage diet; (2) if ability to gain rapidly involves a different genotype than growth ability on a conventional ration; and (3) effect of nutritional environment on effectiveness of selection for growth ability of swine.
Anim. Husb. 12

N. C. Testing Inbred Lines of Swine. To determine (1) whether hogs produced from inbred lines of swine in line-crosses or top-crosses will be superior for commercial purposes to those obtained by crossing outbred members of the pure breeds; (2) which lines perform best under North Carolina conditions; and (3) development of new and useful inbred lines of swine.
Anim. Indus. 16

N. C. Improvement of Swine by Selection and Breeding Procedures I. Selection for Backfat Thickness in Swine. To (1) measure effectiveness of selection for backfat thickness in a closed population; (2) estimate relative importance of heredity and environment in variability of backfat thickness and other characteristics of swine; and (3) study response of other characteristics to selection for backfat thickness.
Anim. Indus. H-150

Okla. The Development and Testing of Inbred Lines and Selection for Specific Combining Ability in Swine. To learn (1) feasibility of selecting lines for specific combining ability in a reciprocal recurrent selection program; (2) test single crosses of lines with other lines to identify desirable multiple lines cross combinations for commercial use; (3) develop improved methods of selecting breeding stock for traits of economic importance; and (4) sample existing breeds of hogs more extensively for genetic material to be used in developing lines.
Anim. Husb. 808 Coop. ARS

P. R. *Improvement of the Swine of Puerto Rico*. To develop swine with maximum adaptation for use in Puerto Rico.
Anim. Husb. and Vet. 42

S. C. *Relations of Certain Animal and Carcass Characteristics to Yield of Lean Cuts in Swine*. To (1) learn rate and efficiency of gains of selected pigs from production registry litters produced by State swine breeders; (2) ascertain relation of animal and carcass characteristics to yield of lean cuts in swine; and (3) assist breeders in producing certified meat type litters from production registry litters.
Anim. Husb. 131

S. Dak. *Inbreeding, Linecrossing, and Selection Within the Hampshire, Duroc, and Yorkshire Breeds.* To (1) investigate methods of breeding and selection for improvement of swine in litter size, vitality, growth rate, economy and gain, and carcass desirability; and (2) demonstrate application of methods learned by research.
Anim. Husb. 124R Coop. ARS

Tenn. *Improvement of the Producing Ability of Swine Through Performance Testing and Breeding Methods*. To (1) study various methods of breeding and selection for the improvement of performance of swine in litter size, viability, growth rate, efficiency of gain, and carcass desirability; (2) evaluate productive performance of established and new breeds of swine and of lines within breeds for traits of economic importance; and (3) study crossing performance of established and new breeds of swine and of lines within breeds in various crossbreeding and linecrossing systems.
Anim. Husb. 73

Tex. *Swine Breeding Improvement Based on Performance*. To (1) develop and standardize procedures and techniques for testing production performance of economically important characteristics in breeding and market hogs; (2) identify and develop superior lines of breeding stock as to prolificacy, weaning weight of litter, rate and economy of gain, net carcass merit, and longevity of breeding stock; and (3) determine estimates of heritability for and genetic correlations between traits in second objective.
Anim. Husb., Home Econ. 956

Wash. *Development of a Bacon-Type Hog Adapted to the Feed and Climatic Conditions of the State of Washington*. To develop strains of swine which are adapted to the feed and climatic conditions of Washington and which will produce carcasses containing the maximum amount of lean meat and the minimum amount of fat consistent with firmness of flesh.
Anim. Husb. 671

PHYSIOLOGY

General Physiology

Mich. Hormone Studies Related to the Physiology of Domestic Animals Including Investigations With Radioactive Isotopes. To (1) study mechanisms of thyroid function and variations in secretion rate of laboratory and domestic animals: learn optimum levels and combinations of hormones for inducing mammary growth and lactation; and (2) investigate gametokinetic factor in cattle feces with reference to its specificity for pregnancy diagnosis. (Goats and Chickens).
Vet. Sci., Dairy, Anim. Husb. 25

Mich. Effects of Hormonal Imbalances on Nutritional Requirements. To determine the effects on specific dietary needs resulting from (1) administering large doses of cortisone, estrogens, androgens, thyroid-active substances, insulin and growth hormone; (2) removing adrenals, gonads, thyroids; or (3) from treatment with thiouracil or alloxan. It is hoped that these studies will further elucidate interactions between hormones and dietary factors in the body so that both may be used with greater efficacy and safety in the future. (Rats, Mice and Chickens).
Poul. Husb., Vet. Med. 105

Mo. Endocrine Secretions as Related to Growth, Reproduction, and Gene Action. To learn (1) influence of sex on performance, body development, and carcass quality of market hogs; (2) influence of various hormone treatments on performance, body development and carcass quality in growing-fattening pigs and on milk production in sows; and (3) influence of hormones on phenotypic expression of gene action.
Anim. Husb. 276

Reproduction and Lactation

Ga. The Effects of Feeding an Antibiotic on the Reproductive Performance of Brood Sows Over Several Generations. To (1) determine effects of feeding an antibiotic to sows during gestation-lactation with respect to litter size, birth weights, weaning weights, and number of pigs weaned per litter; and (2) conduct investigation over several generations to study any effects on life cycle reproductive performance of sows.
Anim. Husb. 315

Ill. Physiology of Reproduction in Swine. To study reproductive phenomena in swine, with particular reference to parturition, in order to find a method of controlling this process with respect to time of its occurrence.
Anim. Sci. 20-352

Ill. Physiology of Mammalian Germ Cells as Related to Embryonal Mortality. To (1) learn effects of aging germ cells, in vivo and in vitro, on embryonal mortality and subsequent development; and (2) determine effect of various storage media and of temperature on viability of germ cells.
Anim. Sci. 20-383

Iowa Viability and Growth of Pigs as Affected by the Nutrition of the Sow During Gestation and Lactation. To determine (1) causes of pig losses attributed to the nutrition of the pigs both in utero and after birth; (2) effects of feeding different rations during gestation upon lactation, and on the growth and development of pigs from birth to market weight; and (3) nutritive requirements of pigs.
Anim. Husb. 959

La. The Value of an All Year Grazing Program on the Reproductive Performance of Swine. To determine value of an all year grazing program for swine selected for breeding animals at weaning age and maintained thru puberty, gestation, parturition and lactation.
Anim. Indus. 811

Mich. A Study of the Effect of Hormones Upon Bacteria Found in the Reproductive Tract of Certain Farm Animals. To determine (1) physiological effect in vitro of gonadal hormones upon pathogens isolated from reproductive tract; and (2) same effects in vivo of these hormones upon selected infected animals.
Vet. Med. 109

Minn. The Effect of Maternal Nutrition on Development, Growth and Performance of the Young. To study with small animals and farm animals the effect of restrictions in calories, protein, minerals, vitamins and protein quality in the mother's ration on the development, growth and performance of the young. (Rats used).
Agr. Biochem. 1514

Mo. Biochemical, Physical, and Physiological Aspects in Natural and Artificial Breeding. To (1) make a thorough study of the chemistry and/or biochemistry of male and female germ cells in order to gain knowledge which is needed as a basis for future investigations involving (a) ova and spermatozoa storage and preservation, (b) artificial insemination, (c) ova transfer, (d) fertilization mechanism, and (e) chemistry and physiology of gene action; (2) investigate the enzyme systems and metabolic activities of male and female gametes, the results of these studies being basic requirements for further work on storage media, cold shock phenomenon of spermatozoa, low temperature storage of ova and spermatozoa, and possibly to other reproductive processes or activities affecting fertility and litter size; (3) characterize and isolate certain factors present in egg yolk, boiled milk, chick embryos and other biological tissues which aid in preservation of the viability of spermatozoa of farm animals and protect them against a number of adverse environmental conditions including sudden lowering of temperature; and (4) make further investigations into the physical requirements of male and female germ cells.
Anim. Husb. 81

Mo. Estrus, Ovulation, Nidation, Embryonic Deaths and Related Phenomena in the Female Spermatogenesis and Related Physiological Functions in the Male. To study the fundamental anatomy and physiology of the reproductive organs of farm animals with special emphasis, at present, on the litter bearing animal, swine.
Anim. Husb. 222

Mo. The Role of Hormones in the Biochemical and Physiological Activities of the Reproductive Organs. To (1) learn role of various endocrine secretions in reproductive cycle, and interrelationships existing between the many endocrine secretions; (2) study changes, enzymatic and otherwise, induced in uterine tissues by steroid hormones; (3) develop diagnostic tests to determine reproductive efficiency of a female, and the discovery of therapeutic methods and production practices conducive to maximum productivity in the female; and (4) study mechanism of hormone action at cellular level and interrelationship of vitamins, hormones and enzymes in normal and pathological reproductive physiology.
Anim. Husb. 223

Okla. Sterility, Reproduction, and Lactation Disorders in Swine. To (1) study a wide range of nutritional problems in raising, with the aid of the sow, a higher percentage of the pigs farrowed, and raising them to heavier weights at 12 weeks of age; (2) determine effect of treatment to 12 weeks on subsequent performance of pigs fed to market weight on a standard ration; (3) study effect of feeding antibiotics continually over a period of several generations as compared to feeding the antibiotic only to young pigs; and (4) use the rat for "pilot" research on effects of dietary factors upon growth, reproduction, and lactation--and, more specifically, to (a) study effect of the physical state of the ration on amount of feed consumed by young pigs, (b) evaluate addition of antibiotics in rations for young pigs, and study the kind, level, and method of administration, (c) study effect of adding materials, as molasses and flavoring agents, on feed consumption of young pigs, (d) study effect of level and quality of protein in rations for pigs during nursing and immediate post-weaning period, (e) continue investigation on factors in successful reproduction and lactation in the rat, primarily the effect of vitamin B_{12}, and (f) continue investigation on dietary factors in reversal of growth depression induced by thyrotoxicosis in young weanling rats.

Anim. Husb., Chem. 603

Oreg. Increasing Fertility of Male Farm Animals Through Improvement of Semen Production, Evaluation and Preservation. To (1) investigate factors regulating testicular activity particularly as related to increased semen production; (2) improve methods of semen evaluation to differentiate good quality from that of low fertilizing capacity; and (3) develop better methods for semen preservation to maintain higher vitality of spermatozoa than is present in storage by conventional methods of freezing.

Anim. Husb. 155

Tenn. The Effect of Radiation on Reproductive Physiology in Farm Animals. To evaluate effects of acute and chronic irradiation on reproductive physiology and growth in farm animals on (1) semen characteristics; (2) potential fertility in the male; (3) estrual cycle phenomena in the female; (4) potential fertility in female; (5) endocrine system; and (6) growth of young animals.

Anim. Husb. 66 Coop. ARS

Tex. A Study of the Maturation Process in the Ova of Mammals. To (1) determine normal maturation process of egg nucleus in cow, ewe, sow, mare, and mule; (2) ascertain maturation response of egg nucleus during induced ovulation in both the follicular and luteal phase of the cycle; and (3) obtain data for cause of infertility of mammalian eggs.

Anim. Husb. 854

Tex. Factors Affecting Reproductive Efficiency in Swine. To (1) learn effects of various feeding and management factors upon reproductive performance in swine under Texas conditions as they affect (a) attainment of puberty, (b) number of ova released during first few heat periods, (c) cytological characteristics of ova released in first few heat periods, (d) embryo survival; and (2) ascertain extent to which size of litter farrowed is influenced by (a) seasonal effects, (b) breed differences, and (c) hormone therapy.

Anim. Husb. 870

Tex. A Study of the Nutritional Requirements for Reproduction and Lactation. To (1) learn nutritional requirements for reproduction and lactation using rats as experimental animals; (2) concentrate and identify unidentified factor(s) needed for reproduction and/or lactation; and (3) learn kinds and proportion of ingredients to use in diets composed entirely of natural feed stuffs in order for females to wean maximum number of young.

Biochem. and Nutr. 974

Tex. Determination of Progesterone and Pregnandiol in Swine and the Relation of Progesterone Therapy to Embryonic Survival. To (1) develop techniques for measuring levels of progesterone and related substances present in gilts during 1 complete reproductive cycle; (2) learn level of these substances present in bred and non-bred gilts; (3) correlate level of progesterone and related substances during pregestation and gestation with ovulation rate, fertilization rate, and embryonic mortality; and (4) learn effect of progesterone therapy on embryo survival as pertaining to periods of stress, and method of administration, if objectives prove it feasible.

Anim. Husb. 1097

Wis. Causes of Low Fertility in Swine. To (1) determine phases of reproductive process where failure is most likely; (2) develop methods of diagnosis of causes; (3) identify reproductive failures with their most likely cause; and (4) recommend, on basis of findings, researches on breeding, nutrition, and swine management to correct existing low fertility.

Genet., Anim. Husb. 724

NUTRITION

General Nutrition

Ark. Nutrition of Swine. To determine nutritional needs of swine in various growth stages, effect of nutrition of sow on nutritional value of milk for young pigs, inter-relationships of various nutrients, symptoms and etiology of nutritional failures, best and most economical methods to prevent and reduce failures, and effect of various food nutrients in nutritional value of meat for human use.
Anim. Indus., Vet. Sci. 306

Calif. Fiber and Fibrous Feeds in Nutrition. To (1) study utilization of isolated fiber (cellulose, hemicellulose, lignin and combinations) and fibrous feeds, by rats, pigs, cattle and sheep through use of ad libitum and paired feedings, N balance, and digestibility; (2) make chemical studies on methods of analysis and isolation of fibers; and (3) apply findings to the utilization of forage.
Anim. Husb., Engin., Agron. 1569

Fla. Nutritional Requirements of Pigs Weaned at an Early Age. Obtain basic information on nutritive requirements of baby pigs.
Anim. Husb. 738

Fla. The Nutritive Value and Storage Characteristics of Cobalt-60 Irradiated Foods and Feeds. Develop techniques for maintaining the nutritive value and palatability and extending storage period of foods and feeds preserved by irradiation with Cobalt-60 at pasturization and sterilization levels.
Anim. Husb. & Nutr., Food Technol. & Nutr. 849

Ga. A Study of Energy Levels and Other Variables in Rations for Growing Fattening Hogs in Drylot and on Pasture, and the Effect of the Ration on Carcass Quality. To study (1) relationship of protein, vitamins, antibiotics, and other materials to energy levels for growing-fattening pigs in drylot and on pasture; (2) use of certain forages and pasture combinations for growing-fattening hogs; (3) effect of these feeding practices on carcass quality.
Anim. Indus. 49

Ga. *Gestation-Lactation Feeding of Sows and Their Litters.* Study: (1) effect of various gestation rations and pasture or management practices on sow performance, litter size, weight, and strength of pigs at birth, and pig survival; (2) value of various lactation rations and pastures on sow and nursing pig performance; (3) consumption and value of various creep rations for nursing pigs; and (4) possibility of reducing breeding herd cost by use of more economical gestation-lactation rations and earlier weaning.
Anim. Indus. 53

Ga. *The Effect of Nutrient Inter-relationships on the Efficiency of Swine Rations Fed in Drylot.* Study (1) protein-energy relationship in rations as it affects growth and feed efficiency, (2) effect of energy level on lysine and methionine requirement; (3) relationship of certain of the B-vitamins to energy level of feed; (4) relationship of Ca and P to energy level of swine diets.
Anim. Husb. 338

Hawaii *Feeding Experiments with Livestock Designed to More Fully Determine the Possibilities and Proper use of Locally Available By-Products.* To more fully utilize by-products available in Hawaii and make the Territory more self-sufficient in the matter of meats and animal products.
Anim. Sci. 265

Idaho *Specific Nutrient Deficiencies of Feeds Available to the Growing Pig.* To (1) determine nutrient deficiencies of rations composed of feeds available to swine producers of Idaho for young pigs from weaning to 80 pounds, (2) identify nutritional deficiency symptoms of pigs fed rations deficient in specific nutrients, and (3) develop rations from available feeds that will support optimum growth and health of the young pig.
Anim. Husb., Vet. Sci. 235

Ill. *Nutritional Aspects of Aging in Animals.* (1) Evaluate impact of aging in animals on requirements for, and metabolism of, certain nutrients. (2) Learn effect of age in rat upon following processes; intestinal absorption of thiamine-C^{14}, cyanoco-balamin-Co^{60}, Ca^{45}; synthesis of the coenzyme forms of thiamine; occurrence of "bound" and "diffusible" Ca in muscle and liver; uptake of Ca by the bones; digestibility of protein N.
Anim. Sci. 20-357

Ill. *The Effect of Feeding the Soybean Plant or its Fractions on Animal Reproduction, Growth, Lactation, and Aging.* To (1) learn cause for impaired reproduction and other physiological failures in female rabbit fed a diet composed of 49.5 parts soybean hay, 49.5 parts of ground wheat and 1.0 part NaCl, (2) extend study to dairy cattle and goats to learn reasons why soybean forage as a nutrient source has lost favor with dairymen in Illinois, (3) study soybean dietary factors as related to vitamins, hormones, and body metabolism.

Dairy Sci. 35-312

Iowa *Rations and Other Factors Concerned in Growing and Fattening Pigs.* To (1) determine fundamental nutritive requirements of swine and practical requirements under pasture and drylot feeding conditions, (2) determine how to improve efficiency of corn-soybean oil meal ration for growing-fattening pigs in drylot and on pasture, (3) compare efficacy of pasture vs. drylot production of growing-fattening hogs, and (4) study effects of different rations upon carcass quality.

Anim. Husb., 930

Iowa *The Role of Enzymes in Swine Nutrition.* To learn (1) qualitative and quantitative digestive enzyme developmental changes in baby pigs while nursing mother and after weaning at different ages from one week of age; (2) effects of feeding different proteolytic, and amylolytic enzymes on pig performance; (3) qualitative and quantitative presence of enzymes in sows milk at different periods of lactation.

Anim. Husb., Bact., Vet. Physiol. 1305

Mich. *Biological and Biochemical Functions of Certain Nutritional Factors in Swine Feeding.* Learn effect of (1) various mineral imbalances on swine parakeratosis with particular reference to role of Ca and Zn in etiology of disease as well as effects of these substances on growth and feed efficiency; (2) increasing growth rate and improving feed efficiency through addition of various chemicals as antibiotics, sulfonamides, and other organic compounds; (3) certain feeding methods on growth and feed utilization; (4) nutrition and management on carcass quality.

Anim. Husb., Agr. Chem., Vet. Path. 44

Minn. The Nutrition and Management of Pigs from Birth to Weaning. To (1) develop satisfactory substitute for sow's milk, nutritionally, and economically; (2) develop satisfactory, economical dry ration for baby pigs so as to wean early from the sow or from "artificial" milk; and (3) learn most satisfactory management procedures to use when pigs are weaned early.
Anim. Husb. 1412

Minn. The Relation of Nutrients to Metabolic Processes. A wide variety of techniques and procedures will be used in this project to study with laboratory animals and with tissues derived from them and from larger animals the chemical reactions involved in metabolic processes and the enzymes associated with them. Of the many ramifications of the problem, attention will initially be focused on: (a) the metabolic function of vitamin E, studying (1) the possible importance in enzymic oxidation-reduction processes of a primary oxidation product of vitamin E which has already been recently discovered and isolated in this laboratory, and (2) the relation of vitamin E to oxidative phosphorylation processes in the organism; (b) the role of potassium in metabolic phosphorylations associated with the utilization of glucose; (c) the possibility that thyroxine may form a reversible oxidation product; and (d) the nitrogen metabolism in the early postnatal period.
Agr. Biochem. 1508

Minn. Diet as a Factor in Swine Reproduction. To (1) develop satisfactory method of restricting energy intake when animals are self-fed; (2) determine minimum level of energy which will produce satisfactory reproduction and lactation; and (3) determine minimum level of protein adequate for satisfactory reproduction and lactation.
Anim. Husb. 2214-4

Miss. A Study of the Factors Influencing the Quality of Tankage when Fed to Swine as a Protein Supplement. (1) Study factors influencing quality or nutritional value of tankages. (2) Correlate microscopic examinations, pepsin digestion, and/or N solubility with protein value of tankage.
Chem., Anim. Husb. HE-9

Miss. A Comparison of Soybean Meal with Degossypolized Cotton-Seed Meal with and without Supplemented Amino Acids as a Protein Supplement for Swine. To determine relative value of degossypolized cottonseed meal and soybean meal as a protein supplement for swine, and study effects of supplemented amino acids upon these rations.
Anim. Husb. HE-15

Mo. Nutritive Requirements of Swine. (a) Vitamins and unrecognized nutrients in swine nutrition, (b) Proteins and animo acids in swine nutrition, (c) The nutritive requirements and manner of feeding suckling pigs, (d) The influence of plane of nutrition on carcass desirability in swine.
Anim. Husb. 141

Mo. Nutritive Requirements of Swine. (b) Proteins and Amino Acids in Swine Nutrition. To study the level of protein required by weanling pigs in dry lot and to study effect of adding amino acids to rations of natural feedstuffs that are thought to be low in these amino acids.
Anim. Husb. 141-b

Mo. Nutritive Requirements of Swine. (c) The Nutritive Requirements and Manner of Feeding Suckling Pigs. To formulate rations that will promote fast, economical gains in suckling pigs and employ methods of feeding to obtain optimum consumption of the rations.
Anim. Husb. 141-c

Mo. Nutritive Requirements of Swine. (d) The Influence of Plane of Nutrition on Carcass Desirability in Swine. To determine effect of good quality pasture combined with a limited grain ration on production costs and carcass quality of market hogs.
Anim. Husb. 141-d

Nebr. Naturally Occurring Enzyme Inhibitors and Their Nutritional Significance. To study (1) occurrence of enzyme inhibitors in natural feedstuffs; (2) mode of action of such inhibitors; (3) their nutritional significance; and (4) means for counteracting effects of these inhibitors.
Agr. Chem. 308

Nebr. The Nutrition and Management of Pigs of Suckling Age. To (1) determine requirements of suckling pigs for specific nutrients, including minerals, proteins and/or amino acids, and water soluble vitamins; (2) determine influence of various dietary factors, (antibiotics, surfactants and trace minerals) on performance of pigs of suckling age; (3) develop a "sow's milk replacer" which can be compounded economically and prepared with liquid skim milk; (4) develop management procedures adequate for managing young pigs reared on "synthetic" milk; and (5) improve creep feeding and management for suckling pigs, with the objective of increasing feed consumption and weaning weights.
Anim. Husb., Chem. 426-A & B

Nebr. Nutrient Requirements of Sows Maintained Continuously in Drylot During the Gestation and Lactation Periods. To determine effect of these sources of unidentified factors upon gestation-lactation performance of first litter gilts; dried whey, dehydrated alfalfa meal, grass juice concentrate, and condensed fish solubles.
Anim. Husb., Dairy Husb. 455-A

N. C. Nutritional Requirements of the Suckling Pig. To determine (1) the trace element requirements of the suckling pig and (2) the hitherto unrecognized growth factors necessary for the growing pig, from one day of age to 8 weeks of age. To improve the nutritional status of the suckling pig both by (a) attempting to increase the quantity and quality of the dam's milk by supplementing her diet and by the development of complete practical diets which, when used either alone or supplements to sow's milk will produce normal growth in pigs from birth to normal weaning time.
Anim. Indus. 23

N. Dak. Gestation Rations for Swine. (1) Compare productivity and efficiency of self-feeding vs. hand-feeding of pregnant sows and gilts. (2) Ascertain if pelleted rations are feasible and economical for gestation. (3) Evaluate effect of feed adjuvants, mineral and vitamin additions, and protein quality on productivity.
Anim. Husb. 7-8

Ohio

Nutritional Requirements of Early Weaned Pigs. Learn, for weaned pigs from 2 to 8 weeks, (1) effect of age and weight on amount and type of protein required in ration, (2) nutritional value of different sources of carbohydate and fat, (3) if physiological and environmental factors in digestive tract influence digestion and utilization of feed at different ages.

Anim. Sci. 56

Okla.

Nutritional and Chemical Evaluations of the Castor Plant (Ricinus Communis). (1) Evaluate practicability of producing an animal feed from castor pomace, by removing toxins and the allergens. (2) Investigate biosynthesis of alkaloid, ricinine in seedling. (3) As data is obtained, broaden scope to include: learning biological value of protein of extracted pomace, learning amount of ricin, ricinine and allergen from castor pomaces derived from different varieties of Ricinus communis, learning amino acid content of these proteins, isolating and identifying new amino acids from ricin and allergen.

Biochem. 1009

Oreg.

Nutrient-Energy Relationships in Swine Rations. (1) Effect improvement in rations for various classes of swine, as measured by criteria of enhanced growth rate, greater efficiency in conversion of feed to meat, carcass excellence, freedom from nutritional disorders and increased economic returns. (2) Assess and record nutritional requirements for swine at different stages of development; relate requirements to expected rate of gain in body weight, blood levels of nutrients, or some such measurable item.

Anim. Husb. 290

Pa.

Influence of Soils and Fertilizers on the Composition and Nutritive Values of Foods and Feeds. To study influence of nutritive conditions of plant growth on composition and nutritive values of agricultural products.

Agron., Anim. Nutr. 1019

S. C.

The Effect of Fattening Rations on Carcass Characteristics of Swine. Learn (1) relative feeding value of various farm grains; (2) effect of these rations on the carcass produced; (3) value of winter forage in ration of fattening swine and its effect on carcass desirability.

Anim. Husb. 340

Tenn. *Mineral Metabolism in Animals* -- *II. Interrelationships of Calcium and Phosphorus with Vitamins, Minerals, Hormones, and Other Factors.* To (1) investigate and separate effect of metabolism of calcium and P certain important factors which are known to influence their behavior in the animal body; and (2) study such elements and substances as are known to induce abnormal bone metabolism that are important for clarification of normal mechanisms and to aid in explanation of toxicological properties.
Anim. Husb., Vet. Sci. 64 Coop. AEC

Texas *An Evaluation of Animal and Vegetable Feeds with Respect to Chemical Composition and Feeding Value.* Obtain reliable information on: (1) cystine content of farm feeds; (2) glycine content of farm feeds. (3) Learn nutritional significance of free lysine epsilon amino groups in various kinds of oilseed meals.
Biochem. & Nutr., Anim. Husb. 521

Texas *Trace Minerals, B-Vitamins, and Amino Acids as Supplements to Swine Rations.* To learn (1) if addition of trace minerals, B-vitamins and amino acids will increase growth rate of pigs fed rations composed mainly of Texas feedstuffs; (2) if addition of any of above is economically profitable; (3) content and availability of above in Texas-grown feeds.
Anim. Husb., Biochem. & Nutr. 1082

Utah *Carcass Characteristics and Feed Lot Performance of Three Strains of Swine Fed Various Levels of Alfalfa Meal and Barley.* To study (1) influence upon carcass and on rate and efficiency of gains that results when level of alfalfa meal is varied from a low of 10% to a high of 50% with accompanying changes in barley levels, (2) interrelationship of breeding, represented by Durocs, Yorkshires, and a strain developed from a cross of the two breeds, and feeding, as associated with rations containing various levels of alfalfa and barley, upon carcass characteristics.
Anim. Husb. 461

W. Va. *Nutritional Requirements of Swine for Growth.* To (1) evaluate efficiency of supplementing swine rations composed of commonly used feedstuffs with known, recognized vitamins; (2) evaluate various crude vitamin carriers as sources of unrecognized nutritional factors for swine; and (3) study effect of antibiotics in swine rations.
Anim. Husb. 22

W. Va. Nutritional Requirements of the Brood Sow. To study need of brood sow for (1) unrecognized nutritional factors needed for optimum performance, and (2) learn value of ration fortification with certain known needed vitamins.
Anim. Husb. 40

Pasture and Forage

Idaho

Dehydrated Alfalfa Hay vs. Chopped Sun Cured Alfalfa Hay for Swine Reproduction and Lactation. To compare relative feeding value when fed at various levels, of dehydrated alfalfa hay and chopped sun cured alfalfa hay for swine reproduction and lactation.
Anim. Husb., Vet. Sci. 229

Ind.

The Effect of Various High-Roughage Gestation Rations on the Birthweight, Livability and Growth Rate of Newborn Pigs. Learn nutritional factors contributing to livability and growth rate of newborn pigs when sows are fed high roughage during gestation. Study value of different silages as to amount of grain that these will replace as well as supplementary nutrients needed to balance these silage rations. Study and design high fiber rations which may be self-fed during gestation.
Anim. Husb. 845

Ky.

Concentrate-Replacement Value of Legume and Cereal Grass Pastures for Bred Sows. Study (1) value of various pastures in terms of replacing energy, protein, vitamins, and minerals commonly supplied in complete mixed feeds; (2) and identify unidentified reproductive factors appearing to be present in dehydrated alfalfa meal.
Anim. Husb. 266

Miss.

The Value of Pastures for Pregnant Sows and Gilts. Compare gestation performance of sows and gilts fed on: (1) Summer pasture of Ladino clover with no grain or supplement; self-fed a ration of ground oats, and a ration of ground oats + soybean oil meal; hand-fed a limited ration of corn, and a limited ration of corn + soybean oil meal, and (2) On winter pasture of oats with some being self-fed a ration of ground oats, and ground oats + soybean oil meal; hand-fed a limited ration of corn, and a limited ration of corn + soybean oil meal.
Anim. Husb. HE-20

Nebr. Nutrients Furnished Growing-Fattening Pigs by Good Quality Legume, Bromegrass-Legume, or Rye Pasture. To determine (1) capacity of high quality forage for wholly or partially supplementing energy portion of swine rations from standpoint of protein, vitamin A, and water soluble vitamins; (2) relative feed replacement value of pasture under full and limited feeding programs; (3) effect of maximum use of forage upon carcass quality in swine; and (4) effect of adding trace minerals, antibiotics, surfactants, and other such materials to good rations upon performance of growing-fattening pigs; and to determine if use of such materials causes a sparing effect for certain nutrients.
Anim. Husb. 427

Nev. Alfalfa For Pig Feed. To determine maximum amounts of ground alfalfa that can be efficiently fed for pork production.
Anim. Husb., Agr. Chem. 41 Coop. ARS

Nev. Factors Affecting the Utilization of High Levels of Alfalfa by Swine. (1) Learn material(s) in alfalfa retarding growth of swine. (2) Develop methods to overcome effects of growth inhibitor(s). (3) Learn limiting factor(s) in alfalfa for reproduction.
Anim. Husb. 42

N. C. Utilization of Ladino Clover Pasture by Swine. To study use of Ladino clover pasture by swine by (1) grazing trials in which Ladino clover pasture will be used as either partial or complete replacement for protein concentrate and for grain, and (2) digestibility trials.
Anim. Indus. 21

Ohio Pastures and Their Supplementation for Pigs. To (1) get data on relative performance, returns, and killing qualities of March and April farrowed pigs that are full fed, and of January or February farrowed pigs that are started earlier and given a limited amount of feed on pasture so the two groups will finish at about the same time, (2) secure further data on amount of protein concentrate needed by full fed spring pigs on Ladino clover or alfalfa pasture, (3) compare different pastures, as bluegrass, red clover, alfalfa, Ladino clover, mixture of legumes, meadow mixture, annual or emergency pastures, (4) compare feeding in drylot and on pasture.
Anim. Indus. 44

Ohio The Nutritive Value of Cured or Dehydrated Legumes in the Drylot Breeding and Gestation Diet for Swine. To (1) further determine the nutritive value of dehydrated or cured legumes in the breeding and gestation ration for swine, (2) learn nature of physiological response, relative to female reproductive performance, affected by the consumption of legumes, (3) study ways of supplying nutrient factors furnished by legumes to breeding and gestating diets containing no green forage material.
Anim. Sci. 136

Pa. The Feeding of Silages to Brood Sows. Study effect of feeding various kinds of silages to brood sows.
Anim. Husb., Agr. & Biol. Chem. 882-C

Concentrates

Fla. Feeding Waste Beef Tallow to Peanut-Fed Swine to Harden Their Fat. Learn effectiveness of waste beef tallow in hardening fats of peanut-fed swine.
Anim. Husb. 739

Ga. Oil Seed Meals in Swine Rations. To determine (1) the necessary supplements for efficient utilization of cotton seed meal, low in gossypol, and (2) supplements necessary for utilization of peanut and other soil seed meals.
Anim. Indus., Chem. 64

Ill. Evaluation of the Concept of Biological Value of Protein for Growth and Maintenance. To (1) learn relationship between protein quality and percentage of protein in diet required to produce maximum gain at different levels of intake of protein and of energy, and (2) learn relationships between biological value of protein, protein concentration in diet, and energy intake.
Anim. Sci. 20-306

Ind. The Amino Acid Requirements of Growing Swine. To determine minimum amount of each indispensable amino acid needed by growing swine when other amino acids are fed at levels to give optimum growth.
Anim. Husb., Biochem. 334

Ind. The Role of Fat in the Nutrition of Swine. To determine (1) optimum level of fat for swine for metabolic needs, growth rate, feed efficiency and carcass quality; (2) type of fat best used by growing and fattening swine (3) specifically minimum fat needs of swine; and (4) "essential fatty acid" needs of swine as to kinds and amounts.
Anim. Husb. 715

La. Swine Feeding. 3. To Determine the Effects of Indispensable Amino Acid Supplementation (Lysine, Tryptophane, Methionine) on the Value of Certain Protein Supplements for Growing-Fattening Swine. To determine amino acid deficiencies of protein feedstuffs for swine by supplementing these feedstuffs with indispensable amino acids such as lysine, tryptophane, and methionine.
Anim. Indus. 761-3

Md. A Study of the Effects of Protein Level on the Reproductive Performance of Female Swine. (1) Learn effects of quantity of protein on reproductive performance of female swine, considering its effect especially on: number, weight, and vigor of pigs born alive and of pigs at 21 and 56 days of age; number and condition of pigs born dead, mummies, etc. (2) Evaluate present recommendations, and if need be, establish new ones for protein levels in rations of pregnant and lactating swine.
Anim. Husb. C-23

Mass. Feeding-Management Practices in the Utilization of Cooked Garbage for Pork Production. Learn seasonal variation in chemical composition of three types of cooked garbage: municipal, restaurant, institution; and most economical ways of supplementing (with protein, minerals, etc.) to develop a balanced ration for growing-fattening pigs, brood sows and gilts. Learn benefits of disease control and management programs. Study carcass of pigs grown by program.
Anim. Husb. 38

Minn. Diet as a Factor in Swine Reproduction. To (1) develop satisfactory method of restricting energy intake when animals are self-fed; (2) determine minimum level of energy which will produce satisfactory reproduction and lactation; and (3) determine minimum level of protein adequate for satisfactory reproduction and lactation.
Anim. Husb. 1415

Minn. Dietary Requirements of Pigs in Dry Lot. To determine the relative feeding value of thin kernels as compared with plump kernels of the same lot of kindred barley.
Anim. Indus. 1416

Miss. A Study of the Factors Influencing the Quality of Tankage When Fed to Swine as a Protein Supplement. (1) Study factors influencing quality or nutritional value of tankages. (2) Correlate microscopic examinations, pepsin digestion, and/or N solubility with protein value of tankage.
Chem., Anim. Husb. HE-9

Miss. A Comparison of Soybean Meal with Degossypolized Cottonseed Meal with and without Supplemented Amino Acids as a Protein Supplement for Swine. To determine relative value of degossypolized cottonseed meal and soybean meal as a protein supplement for swine, and study effects of supplemented amino acids upon these rations.
Anim. Husb. HE-14

Mont. Supplements to Swine Rations Based on Feeds Common to Montana. I. Supplements for growth and fattening -- To determine (1) value in swine fattening rations of an animal protein factor concentrate containing vitamin B_{12} and antibiotics in (a) supplementing ration based largely on barley, linseed meal, and meat meal, and (b) replacing part and all of animal protein source with plant protein and APF concentrate; and (2) compare high-quality sun-cured alfalfa meal with dehydrated alfalfa meal in swine fattening rations. II. Supplements for reproduction and lactation-- (1) To compare gestation-lactation performance of brood sows on a basal ration supplemented with (a) sun-cured alfalfa meal (high quality second cutting); (b) sun-cured alfalfa meal plus APF concentrate; and (c) dehydrated alfalfa meal.
Anim. Indus., Range Mgt., 870

Nebr. Protein and Amino Acid Studies with Swine. To learn (1) qualitative and quantitative amino acid requirements of growing-fattening swine; (2) ability of various natural protein supplemental feeds to furnish these essential amino acids, and ability of the natural protein supplemental feeds to supplement one another in meeting amino acid needs of growing-fattening pigs; and (3) effect of certain dietary factors upon protein requirements of growing-fattening pigs.
Anim. Husb. 386-a

N. Dak. The Quality of Proteins in North Dakota Feedstuffs. To find (1) limiting amino acids of feedstuffs in swine and poultry rations; (2) practical and economical supplements for rations of monogastric farm animals.
Anim. Husb., Poultry Husb. 7-7

N. Dak. Pelleted Feeds for Swine. (1) Learn value of pelleting complete rations, based on cereal grains common to State. (2) Ascertain effect of pelleting process on nutrients. (3) Find economical and feasible ration formulas, using North Dakota cereal grains, for swine producers.
Anim. Husb. 7-9

P. R. The Utilization of Concentrates in the Feeding of Livestock in Puerto Rico. To determine most economical quantities and qualities of concentrate feeds or grain mixtures that may be used satisfactorily for milk, meat, and egg production.
Anim. Husb. 44

Texas A Study of Cottonseed Meal as a Feed in Swine Nutrition. Cottonseed meal will be prepared by use of different solvents and under different processing conditions. Preparations will be examined chemically for their gossypol content.
Anim. Husb., Biochem & Nutr. 438

Vt. Microbial Protein for Feed Supplements. (1) Investigate micro-organisms for their ability to synthesize high quality protein which might be used as feed additives. (2) Learn if strain variability exists among micro-organisms with respect to ability to synthesize an essential amino acid, and to foster variability employing various cultural conditions and utilizing induced mutants.
Biochem., Anim. & Dairy Husb. 11

Feed Adjuvants

Calif. The Effects of Hormones on the Growth and Fattening of Meat Animals. To learn (1) types of hormones best suited for increasing growth or carcass quality, (2) most effective dose, (3) influence of age, sex, and dietary conditions on effect of treatment, (4) mechanism by which hormones influence metabolic activities.
Anim. Indus. 1662 Coop. FES

Ind. The Effects of Antibiotics and Other Feed Additives on the Gain, Feed Efficiency and Carcass Quality of Swine. To learn (1) effect of several antibiotics and other feed additives on rate of gain, feed efficiency, and carcass quality of growing-finishing swine, and (2) level of these compounds necessary for optimum growth response.
Anim. Husb. 943

Nebr. Antibiotics in Swine Nutrition. To (1) further study value of antibiotics, combinations of antibiotics and other growth stimulants in promoting increased gains of growing-fattening swine; (2) determine proper levels of antibiotics for addition to rations of growing-fattening swine; and (3) further investigate effect of feeding antibiotics upon carcass quality—thickness of backfat, percent primal cuts, curing qualities, etc.
Anim. Husb. 386-c

Pa. The Feeding of Hormone and Hormone-Like Materials to Swine. (1) Study effect of feeding graded levels of diethylstilbestrol or methyl testosterone to pigs during growing and fattening period on: rate of gain and efficiency of feed utilization; certain standard carcass measurements at market weights; subsequent reproductive performance of gilts and boars.
Anim. Husb., Agr. & Biol. Chem. 882-B

Pa. The Role of Antibiotics in Protein Metabolism and Growth. To investigage effect of antibiotics on amino acid requirements, utilization of non-protein N, and metabolism of monogastric animals.
Anim. Nutr. 1219

Tenn. Studies of Endocrine Relationships in Farm Animals. - A. Swine. To study effects of stilbestrol on growth rate, feed use and carcass characteristics in swine.
Anim. Husb., Vet. Sci. 58

Minerals

Colo. Mineral Nutrition and Biological Efficiency of Livestock Production. Phase I. The Progressive Variation of the Calcium: Phosphorous Ratio in Growth, Maturation and Fattening. Learn (1) nature of metabolic Ca:P ratio variation with changing age; (2) relationship of Ca:P ratio with nature and degree of fattening. Study (3) biochemical role of Ca in fat deposition; (4) effect of Ca on digestibility and rate of movement of injesta through the alimentary tract.
Anim. Indus. 120

Fla. Investigation of Mineral Nutrition Problems of Livestock Through the Use of Laboratory Animals. To investigate mineral nutrition problems, including mineral inter-relationships that occur in farm livestock, using suitable laboratory animals.
Anim. Husb. & Nutr. 346

Fla. Transfer of Mineral Elements Through the Placenta and Their Distribution in the Fetus. To determine rate and extent of placental transfer of selected mineral elements and to determine distribution of those elements in the fetus.
Anim. Husb. & Nutr. 566

Mich. The Absorption of ZN^{65} in Pigs and Rats as Related to Dietary Calcium and Phosphorus. Study (1) intestinal absorption of Zn in pigs and rats maintained on various levels of levels of dietary Ca, P and perhaps other minerals; (2) mechanism involved in therapeutic effect of Zn on parakeratosis pigs.
Anim. Husb., Agr. Chem. 825

Tenn. Mineral Metabolism in Animals. -- I. Absorption, Distribution, and Physiological Behavior of Calcium and Phosphorus in Farm Animals. To (1) determine the normal distribution of these mineral isotopes administered by the various routes to cattle, swine and sheep, and to study thereby in detail the normal absorption, utilization and skeletal metabolism of selected minerals in these animals; (2) measure endogenous losses of calcium and phosphorus and from these values determine maintenance requirements in the various species as a function of age; (3) determine the biological availability of calcium and phosphorus from the common dietary sources of ruminants, and simple stomached animals; and to study the effects of certain factors such as phytates, oxalates, ration, composition, etc. upon the availability; and (4) apply radioisotope procedures concurrently with accepted indicator methods for the differential measurements of animal response to various dietary treatments.
Anim. Husb., Vet. Sci. 63 Coop. AEC

Wis. *Mineral Metabolism and Mineral Requirement of Animals.* To study (1) effect of mineral supplements of various kinds on animals fed low lime rations, (2) role of inorganic compounds containing such elements as Fe, Cu, Ni, Co, Zn, and Mn, and (3) factors responsible for nutritional anemia and effect of various inorganic elements and compounds in correcting such anemias. Fundamental investigations on the phenomena of hemoglobin building on the body will be continued.
Chem., Anim. Husb. 8

Wyo. *The Metabolism and Chemical Binding of Selenium in the Tissues.* Learn (1) localization and synthesis of organo-selenium compounds *in vivo* by radio-active selenium; (2) if selenium compounds in plant and animal tissues are similar in structure to sulfur containing amino acids; (3) biological activity of isolated compounds, if chemical combination occurs; (4) site of action of selenium in animal tissues by enzymatic method.
Agr. Res. Chem. 639

Wyo. *The Toxic Effects of Sublethal Amounts of Potassium Nitrate on Animals.* Learn effects of diets containing sublethal amounts of potassium nitrate and/or potassium nitrite on (1) pregnant animals; (2) lactating animals and their young. (3) Learn growth rate of animals on diets containing sublethal amounts of potassium nitrate and/or potassium nitrite.
Agr. Res. Chem., Vet. Sci. & Bact., Agron. 675

Vitamins

Ill. Effect of Environment on the Vitamin Requirements of Swine and Poultry. To determine (1) extent environmental temperature and humidity modify requirements of the pig and chicken for vitamins, particularly B-complex; and (2) metabolism of the vitamins under hot and cool conditions.
Anim. Sci. 20-326

Ill. Vitamin E Deficiency in Swine. Try to produce vitamin E deficiency initially in baby pigs, and, if successful, produce deficiency in growing and mature pigs. To characterize physiological, histological, and biochemical lesions produced by a vitamin E deficiency in swine. Study effect of antioxidants in prevention and/or cure.
Anim. Nutr. 20-356

Iowa Sulfonated Sterols in Nutrition. Elucidate action of antirachitic vitamin on theory that in vivo sulfonations are induced by vitamin D. Learn location of sulfonic acid group in antirachitic cholestatetraene sulfonic acid. Synthesize analogous derivatives with and without radioactive carbon. Correlate biological activity.
Chem. 1115

Kans. The Metabolism of Carotenoid Pigments and Vitamin A in Swine. -- 1. The Relative Efficiency of Vitamin A and Carotene for Reproduction in the Sow. To learn how effectively sows utilize carotene, when fed at various levels, for meeting vitamin A needs for reproduction.
Anim. Husb., Chem. 311-1

Kans. Development of Methods of Analyses for Vitamins A and D in Mixed Feeds and Feed Premixes. To develop methods, or modify present methods, suitable for routine determinations of content of vitamins A and D in mixed feeds and premixes.
Chem. 345

Mich. The Effect of Various Nutrient Factors on the Health and Livability of the Baby Pig. To (1) study nutritive requirements of baby pig; (2) study weight gains or losses on various levels of required nutrient; and (3) observe enteric and/or other lesions resulting from feeding a low level of required nutrient.
Chem, Anim. Husb., Anim. Path. 62 (NC-13)

Mo. Nutritive Requirements of Swine. a. Vitamins and Unrecognized Nutrients in Swine Nutrition. To discover nutritional factors responsible for suboptimum production of swine.
Anim. Husb., Chem. 141-a

Texas The Metabolic Interrelationship of Vitamins and Amino Acids in Swine. To determine the effect of (1) dietary level of methionine and lysine on metabolism of these and other amino acids in growing pigs; and (2) adequate and inadequate levels of each vitamin, pyridoxine, pantothenic acid, niacin, folic acid, biotin and vitamin B_{12} on metabolism of amino acids in growing pigs.
Biochem. & Nutr, Anim. Husb. 962

MANAGEMENT

Ark. Effect of Pre-Slaughter Handling and Treatment on Carcass Quality and Market Value. Study methods for improving value of meat produced through management of stock during pre-slaughter period and after completion of farm feeding period.
Anim. Indus. & Vet. Sci., Agr. Econ. & Rural Sociol. 446

Ind. The Effect of Cooling on the Growth of Swine. To determine effectiveness of (1) various types of artificial shade; (2) refrigerated slab; (3) refrigerated drinking water; and (4) water application to surface of swine.
Anim. Husb., Mech. Engin., Vet. Sci. 727

Mich. Effects of Various Environments on Fattening Market Hogs. (1) Attempt to learn the effects of environment on feed efficiency and growth of market hogs. (2) Learn the effects of various floor conditions on the physiology, growth, and feed efficiency of the market hogs.
Agr. Engin., Anim. Husb. 511 (NC-23)

Miss. The Value of Sprinklers and Wallows for Fattening Pigs During Hot Weather. To compare rate of gain and feed efficiency of growing, fattening swine during hot summer weather under these conditions: (a) on concrete dry lots with and without atomizer sprinklers, and (b) in large outdoor dry lots with mud wallows, sanitary concrete wallows, atomizing sprinkler nozzles above concrete drain platforms or no cooling device.
Anim. Husb. HE-21

N. Y. (Cornell) The Development of Materials Handling Methods and Equipment for Reducing Labor in Caring for Livestock Including Reference to Harvesting, Processing, Storing, and Feeding. To develop suitable methods and equipment for handling materials necessary for livestock feeding and care in order to reduce manual labor now required, so that it should be possible to increase the output per man, hence reduce unit cost of production.
Agr. Engin., Anim. Husb. 35 (NE-13)

Okla. The Control of External Parasites. To (1) develop effective repellents to protect animals from external parasites, especially those with resistance to common toxicants; (2) evaluate effectiveness and hazards of new chemicals as pest toxicants; (3) determine best methods to apply insecticides to animals, especially automatic sprayers, rubbing posts and treadle machines; (4) obtain biological data to assist in above objectives; and (5) obtain adequate data indicating gains to be expected from parasite control.
Anim. Husb. 593

CARCASS EVALUATION AND MEAT

Ark. Factors Affecting the Preservation of Cured Pork. To compare various methods of preservation of pork by the cures now available and determine the effects of such factors as elapse of time from slaughter until carcass is chilled, various methods of making carcass cuts, and relative humidity upon preservation of pork cuts in order to determine best methods of curing and handling cured pork.

Anim. Indus., Vet. Sci. 336

Ga. Curing and Smoking Pork and Turkeys. To learn (1) best procedure for curing and smoking pork and mature turkeys in freezer lockers and on farm; (2) best method of handling same before and after curing and smoking; (3) consumer preference for pork and turkeys cured and smoked.

Food Proc. 76

Ga. Carcass and Meat Characteristics as Influenced by Breeding, Feeding and Management Treatments in Cattle, Sheep and Swine. (1) Obtain data on carcasses fattened on grass, drylot, or combinations of these under local conditions. (2) Study relationship of breeding, feeding, and management treatments on carcass and meat characteristics. (3) Use above data in developing procedures for producing meat for consumer preferred type animals.

Anim. Indus. 113

Iowa The Influence of Dietary Supplementation Selection and Breeding on Carcass Quality, and Tissue Composition of Meat Animals. To determine (1) effects of protein, fat, antibiotics, trace minerals, calcium and phosphorus of rations on carcass quality and tissue composition; (2) effect of roughage, protein and protein substitutes, and hormones on quality of lamb and beef carcasses; and (3) make additional studies, largely biochemical, to support objectives above.

Anim. Husb. 1239

Ky. A Study of the Keeping Quality and Shrinkage of Cured Pork from Hogs of Different Degrees of Fatness. To (1) study relative cut out values of pork carcasses from hogs of different degrees of fatness; and (2) determine shrinkage, keeping ability, and rancidity development of cuts from such carcasses.

Anim. Husb., Anim. Nutr. 256

Ky. The Effect of Smoking and of Smoking at Different Temperatures on the Shrinkage, Rancidity, and Palatability of Dry Cured Hams. Compare effect of smoking, and of smoking at different temperatures, on shrinkage, rancidity, and palatability of dry cured hams that will be aged under constant controlled temperature and humidity.
Anim. Husb. 1008

Mich. The Relationship Between Growth, Feed Efficiency, and Carcass Characteristics. To (1) determine variation in feed efficiency between hogs by individual feeding methods; (2) effect of feed restriction on efficiency and carcass characteristics; and (3) study methods of restricting feed intake.
Anim. Husb. 42

Minn. Preparation and Preservation Factors in Relation to the Nutritive Value and Palatability of Meat. -- 2. The Effect of Freezing and Freezing Storage upon the Quality of Meat. To learn the factors which the homemaker must take into consideration in order to have meat of good quality when preserving it by freezing storage.
Home Econ., Anim. Husb. 2003-2

Mo. Development of Improved Methods of Pork Carcass Evaluation. To develop improved methods of pork carcass evaluation.
Anim. Husb. 88

Mo. Food Preservation and Utilization. -- c. Stability in Cured Meats using Ascorbic Acid and other Stabilizers. To determine (1) if ascorbic acid, singly or in combination gives enough improvement in curing time or other advantages to justify cost of its use; and (2) some idea of optimum levels of ascorbic acid required.
Anim. Husb. 100

Mo. Economic Signficance of Pork Grades in Relation to Consumer Acceptability Performance Among Retail Cuts. Learn if consumer preferences would justify sale of pork primal cuts from various grades of pork carcasses at different prices per pound by learning (1) what proportion of consumer population detects a difference in eating satisfaction between grades, (2) grade preferred by consumers, (3) economic significance of preferences, (4) if consumers can identify grades, (5) merchandising potentialities of various grades, (6) effect of processing in relation to consumer preference.
Agr. Econ., Anim. Indus., Home Econ. ES-364

N. C. Microbiological and Chemical Changes Occurring in the Curing of Meat. To ascertain the role played by microorganisms and to follow certain changes occurring in the curing of meat.
Anim. Indus. H-15 Coop. ARS

N. C. Determination of Objective Measurements of Flavor of Aged Country Hams. Evaluate units of measurements developed in prediction equation used in expressing aged ham flavor.
Anim. Indus., Agr. Econ., Home Econ. HM-9

N. C. Techniques for the Objective Evaluation of Pork and Beef Carcasses. (1) Develop techniques useful in appraising pork and beef carcasses. (2) Appraise some of present objective methods now in use for meat quality evaluation.
Anim. Indus. HM-12 Coop. USDA

Ohio Studies in the Processing of Fresh Meat. — Biochemical and Bacteriological Studies Fundamental to the Processing of Fresh Meat. To find methods of processing fresh meat which will upgrade the less desirable carcasses; permit greater quality control along the lines of palatableness; diminish the great variation in consumer acceptability resulting from breeding, nutrition, and handling; augment effectiveness of refrigeration in preserving meat; and prevent certain spoilage such as "bone sour".
Anim. Sci. 70

Utah Chemical Techniques for Detecting Flavor Changes During Meat Processing. Develop chemical techniques for rapid and reliable evaluation of flavor of process meat. Correlate chemical techniques for evaluating flavor of same with organoleptic test on man.
Bot. & Plant Path., Foods & Nutr. 458

Wash. Factors Influencing the Desirability and Nutrient Content of Meat and Meat Animals for Human Consumption. To learn effects of (1) genetics, nutrition, and other factors on carcass quality of meat animals and on quality and nutrient content of meat; and (2) storage, processing, and preservation on quality, nutrient content, physical structure, and economic value of meat and meat products.
Anim. Husb. 1161

W. Va. Prevention of Rancidity in Carcass Fats of Turkeys and Hogs. To (1) study methods to delay development of rancidity in carcass fats of turkeys and hogs; (2) develop and evaluate methods to predict how long carcass fats will keep without becoming rancid under normal storage conditions; and (3) obtain information on movement of vitamin E and other antioxidants from circulatory system to depot fats of living birds and animals.

Agr. Biochem., Poultry Husb. 6

REGIONAL RESEARCH PROJECTS IN RELATED FIELDS MAY BE FOUND IN OTHER PARTS OF THE COMPILATIONS AS FOLLOWS:

NC-13 *Death Losses in Young Pigs*
See Part 23.

NC-23 *Requirements and Design of Structures and Related Equipment for Unified Farmstead Operations*
See Part 3, Sections b and c.

NC-47 *Evaluation of Breeding Systems for Chickens*
See Part 19.

NE-13 *The Mechanization of Forage Crop Harvesting, Processing, Storing, and Feeding*
See Part 3, Sections b and c.

LIST OF COMPILATIONS OF FEDERAL-GRANT RESEARCH PROJECTS AT STATE AGRICULTURAL EXPERIMENT STATIONS

RS-23-8: Part umbers	Subject-Matter Area	Title of Section
1	Agricultural Chemistry	Agricultural Chemistry
2	Agricultural Economics	a. Prices, Incomes, & General Studies of Commodities & Industries
		b. Farm Management
		c. Land Economics
		d. Farm Finance & Taxation
3	Agricultural Engineering	a. Land & Water Use & Development
		b. Power Machinery & Equipment
		c. Farm Structures & Materials
4	Animal Husbandry	a. Beef Cattle
		b. Sheep & Goats
		c. Swine
5	Dairy Husbandry	Dairy Cattle
6	Dairy Technology	Dairy Technology
7	Entomology & Economic Zoology	a. Field Crop Insects
		b. Fruit, Nut & Vegetable Insects
		c. Miscellaneous Insects & Economic Zoology
		d. Insecticides
8	Field Crops	a. Cereal Crops
		b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology	a. Food Chemistry, Microbiology, Sanitation & Public Health
		b. Food Engineering, Processing, Product and Process Development, Utilization and Waste Disposal
		c. Food Quality & Standards, Acceptance, Preference, & Marketing
10	Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11	Forestry	Forestry

ARS-23-8: Part Numbers	Subject-Matter Area	Title of Section
12	Fruits & Nuts	Fruits & Nuts
13	Home Economics	a. Human Nutrition b. Housing c. Clothing & Textiles d. Foods-Consumer Quality & Utilization e. Household Economics & Management
14	Economics of Marketing	a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	a. Plant Pathology, Botany, & Diseases of Miscellaneous Crops b. Diseases of Field Crops c. Diseases of Fruit Crops d. Diseases of Vegetable Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils	a. Soil Chemistry & Microbiology b. Soil Fertility, Management & Soil-Plant Relationships c. Soil Physical Properties, Conservation & Classificatio
22	Vegetables	a. Vegetable Crops b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control